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ORIGINAL

Assessment of the Psychometric Validity of the OIT-WHO Work Stress Scale in Teachers in the Ñuble Region, Chile

Evaluación de la Validez Psicométrica de la Escala de Estrés Laboral OIT-OMS en Docentes de la Región de Ñuble, Chile

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ABSTRACT

Introduction: the detrimental effects of job stress on the physical and mental health of workers, especially in an educational setting, have been widely documented. This study aimed to analyse the psychometric validity of the ILO-WHO Work Stress Scale in a sample of teachers in the Ñuble Region of Chile.
Method: a cross-sectional validation study was carried out with 384 teachers. Sample adequacy was assessed using the Kaiser–Meyer–Olkin (KMO) test, while exploratory factor analysis (EFA) employed orthogonal rotation and unweighted robust least squares.
Results: the results revealed a valid unidimensional structure, with an internal reliability coefficient of 0,977. The variance explained was 63,4 %, indicating that teachers' perceived stress is concentrated in a single factor.
Conclusions: these findings suggest that the scale is an effective instrument for assessing and managing stress in education professionals, and it could inform future interventions aimed at mitigating the effects of job stress in this population.

Keywords: Job Stress; OIT-WHO Scale; Psychometric Validity; Teachers; Well-Being.

RESUMEN

Introducción: el estrés laboral ha sido ampliamente documentado por sus efectos perjudiciales sobre la salud física y mental de los trabajadores, especialmente en el ámbito educativo. Este estudio tiene como objetivo analizar la validez psicométrica de la Escala de Estrés Laboral OIT-OMS en una muestra de docentes de la Región de Ñuble, Chile.
Método: se realizó un estudio de validación con diseño transversal que incluyó a 384 profesores. Se evaluó la adecuación muestral a través de la prueba Kaiser-Meyer-Olkin (KMO), mientras que el análisis factorial exploratorio (AFE) empleó rotación ortogonal y mínimos cuadrados robustos no ponderados.
Resultados: los resultados mostraron una estructura unidimensional válida, con un coeficiente de fiabilidad interna de 0,977. La varianza explicada fue del 63,4 %, indicando que el estrés percibido por los docentes se concentra en un único factor.
Conclusiones: estos hallazgos sugieren que la escala se configura como un instrumento eficaz para la evaluación y gestión del estrés en profesionales de la educación y pueden guiar futuras intervenciones destinadas a mitigar los efectos del estrés laboral en esta población.

Palabras clave: Estrés Laboral; Escala OIT-OMS; Validez Psicométrica; Docentes; Bienestar.

INTRODUCTION

Work-related stress is a phenomenon of great relevance in the field of occupational health, given its negative impact on the physical and mental well-being of workers, as well as on organizational effectiveness.[1] According to the International Labor Organization (ILO) and the World Health Organization (WHO), work-related stress is defined as a physical and emotional response that arises when the demands of work exceed the capacity, resources, or needs of the individual.[2] This problem becomes more pressing in sectors with demanding working conditions, such as education, where teachers experience considerable stress due to factors such as academic pressure, classroom management, and institutional and social expectations.[3]

To facilitate the identification and assessment of stress in various work environments, the ILO and WHO have developed the Work-Related Stress Scale. This instrument was specifically designed to measure workers' perceived stress levels and to identify particular elements that contribute to its origin, such as workload, organizational climate, interpersonal relationships, and social support.[4] The scale has been used in numerous studies to characterize work-related stress and guide the implementation of effective interventions.[5] However, its psychometric validity and cultural relevance require careful evaluation in specific contexts, especially in regions where research on psychosocial risks is still limited.

The ILO-WHO Work-Related Stress Scale has been widely used to assess stress levels in various professions, including teaching. This instrument, designed to measure both perceived stress and stressors, has proven effective in identifying critical areas for intervention in different work environments.[6] However, multiple studies have highlighted the need to adapt and validate this instrument in specific populations, as stressors can vary considerably depending on cultural and occupational characteristics.[6]

In the context of Latin America, teachers have gained increasing attention in research on work-related stress due to the unique challenges they face, such as resource shortages, work overload, and the emotional demands of interacting with students. In an Argentine study that adapted and validated the ILO-WHO Work Stress Scale in a sample of secondary school teachers, high internal consistency (Cronbach's alpha = 0,87) and a factor structure explaining 72 % of the variance were obtained,[7] where the study highlighted that the most impactful factors were workload and the perception of insufficient social support. Similarly, an analysis conducted in Peru examined the relationship between work stress, as measured by the scale, and mental health indicators in university teachers. The results revealed that the scale is a significant predictor of burnout symptoms, particularly in the dimensions of emotional exhaustion and depersonalization, highlighting the need to validate the instrument in this population.[8]

In Chile, psychosocial well-being has become a strategic focus for improving educational quality and equity under the National Public Education Strategy. This is in line with the 2021-2030 Health Objectives of the Chilean Ministry of Health, whose priority focuses on mental health and the reduction of territorial inequalities, which is relevant for regions with a high proportion of rurality and geographical dispersion such as Ñuble. In this context, continuing with the validation of the ILO-WHO Work-Related Stress Scale in Spanish-American and, specifically, Chilean teaching populations is essential for the design of specific intervention strategies that improve well-being at work and reduce the risks associated with chronic stress in this professional group.

In the present study, the psychometric validity of the scale is explored in a sample of teachers, addressing key aspects such as internal consistency, factor structure, and the relationship of the scale with fundamental indicators of mental health and occupational well-being.

METHOD

A cross-sectional validation study of the ILO-WHO Work Stress Scale was conducted between July and December 2024 in Chile. The target population was teachers in preschools, schools, and universities in the Ñuble Region. Teachers were included who a) were of both sexes, b) worked full-time or part-time, c) taught preschool, elementary, and/or middle school, d) had been working for more than three months, and e) signed the informed consent form. Teachers who worked part-time in administrative positions and who had a history of previous psychiatric illness were excluded. A non-probability convenience sample was taken, which allowed access to 337 teachers who responded to a questionnaire to collect sociodemographic background information and, subsequently, the ILO-WHO Work Stress Scale.[9] The purpose of this instrument is to identify and quantify the organizational sources of stress experienced by workers, in order to guide preventive actions and improvements in management and the work environment. The original scale consists of 25 items, in a Likert format from 1 to 7 points ("never" to "always"), which assesses seven latent constructs: a) organizational climate, b) organizational structure, c) organizational territory, d) technology, e) leader influence, f) lack of cohesion, and g) group support. The classification of stress according to the scores obtained is: low stress level (<90,2), intermediate level (90,3-117,2), stress (117,3-153,2), high stress level (>153,3).

Data collection

The procedure involved a self-administered online application using Google Forms. For recruitment, the

directors of the participating establishments were contacted, who shared the link to the questionnaire with their teaching staff. Each participant accessed the form voluntarily and gave their electronic informed consent before responding. The survey was completed in a single session per participant, during working hours and from any device with an internet connection. Each teacher involved in the study completed the questionnaire in an estimated time of approximately 20 minutes.

Ethical considerations

Before completing the scale, participants who met the eligibility criteria read and signed an informed consent form approved by the Scientific Ethics Committee of the Mutual de Seguridad CChC (Resolution CI No. 203), Chile. They also clarified any doubts and confirmed the voluntary and confidential nature of their participation in the study. Responses were only labeled with a pre-established code, without names or other information that could identify the respondent.

Statistical analysis

The statistical analysis of the document first included a description of the sample using measures of central tendency and dispersion (median and interquartile range for continuous variables) and frequencies/percentages for categorical variables. Given the ordinal nature of the 25 items on the ILO-WHO Scale, a polychoric correlation matrix was constructed and the feasibility of factor analysis was evaluated using the KMO index and Bartlett's sphericity test. Subsequently, a unifactorial exploratory factor analysis was performed using robust unweighted least squares (RULS) with orthogonal rotation, and the number of factors was decided by parallel analysis. Internal reliability was estimated using Cronbach's alpha and expected a posteriori reliability.

RESULTS

First, a descriptive analysis of the sociodemographic characteristics of the target population (N=337) was carried out, which is attached in Table 1. The average age of the sample was 38,63 years, with 76,56 % of the sample being women. In turn, 75,07 % of the sample were full-time professionals and 35,91 % were primary school teachers.

Table 1. Sociodemographic characteristics of the study population (N=337)

Characteristic	Result
Age (mean/ X, interquartile range/ IQR)	38,63 (31-45)
Gender (N/ %)	
Female	258 (76,56)
Male	79 (23,44)
Years of work experience (X/ RIQ)	11,95 (5-15)
Hours of employment contract (N/ %)	
Part-time	84 (24,93)
Full	253 (75,07)
Professional performance level (N, %)	
Pre-basic	29 (8,61)
Basic	121 (35,91)
Secondary	99 (29,38)
University	88 (26,11)
Work stress score (X, RIQ)	85,04 (57-109)

a. Exploratory factor analysis (EFA)

An Exploratory Factor Analysis (EFA) was performed to evaluate the factor structure of the original instrument (7 constructs) using the orthogonal rotation technique, which is a recognized method for facilitating the interpretation of the extracted factors. In this context, the Kaiser-Meyer-Olkin (KMO) sample adequacy test provided a coefficient of 0,963, indicating excellent adequacy for performing factor analysis. This result was complemented by Bartlett's sphericity test, which proved to be statistically significant ($p<0,001$), confirming that the correlations between the elements of the instrument were sufficiently high to justify the analysis. The retention criteria favored a unifactorial solution; consequently, no rotation was applied, and the loadings correspond to the unrotated solution.

The results obtained, detailed in table 2, indicate the scores assigned to each factor, the variance explained by the eigenvalues, and the total variance of the instrument analyzed. Upon examining the scores, it was

observed that only one item (EO2.16) had a score approaching half of the maximum possible score, while most items fell into the lower response categories of "never" or "rarely."

Analysis of the concentration of variance through eigenvalues revealed that the first item had a predominant load, suggesting a unidimensional behavior of the instrument evaluated. Subsequently, parallel analysis indicated a percentage of explained variance of 63,40 % for the first item, indicating that there is a central dimension that explains a significant proportion of the work stress variable.

Finally, the estimated reliability of the analysis was relevant, with a reliability coefficient of 0,977, indicating high internal consistency in the evaluation of the items and their relationship with the work stress construct. The implementation of this methodological approach provides a solid framework for future research seeking to deepen the measurement of work experiences and their effect on well-being, which could contribute to the formulation of more effective interventions and policies in the workplace.

Table 2. Score for each factor, variance explained by eigenvalues, and percentage of variance in actual data

Code	Item	Score (95 % CI)	Variance (Eigenvalues)	% Variance (Actual Data)
CO1.1	People do not understand the **organization's** mission and goals.	3,28 (3,03-3,53)	15,21	63,42
EO2.2	The way reports are submitted between superiors and subordinate makes me feel pressured.	3,34 (3,09-3,60)	0,70	2,61
EO2.16	I am not in a position to control the activities in my work area.	3,83 (3,56-4,10)	0,52	2,16
TO3.3	The equipment available to carry out the work on time is limited.	2,52 (2,26-2,79)	0,43	1,73
TO3.15	My supervisor does not stand up for me in front of the bosses.	2,68 (2,38-2,98)	0,42	1,59
T4.4	My supervisor does not respect me.	3,25 (3,00-3,51)	0,37	1,49
T4.25	I am not part of a close-knit work group.	2,72 (2,43-3,00)	0,32	1,15
CO1.10	My team does not support my professional goals.	2,49 (2,23-2,74)	1,49	6,01
CO1.11	My team does not enjoy status or prestige within the organization.	2,72 (2,44-3,00)	0,99	4,16
CO1.20	The organization's strategy is not well understood.	2,26 (1,98-2,55)	0,71	2,92
EO2.12	General policies initiated by management prevent good performance.	2,11 (1,86-2,37)	0,63	2,31
EO2.24	A person at my level has little control over the work.	2,08 (1,80-2,36)	0,45	1,91
TO3.22	My supervisor does not care about my personal well-being.	1,61 (1,38-1,84)	0,39	1,54
T4.14	Technical knowledge is not available to remain competitive.	2,00 (1,76-2,25)	0,33	1,28
IL5.5	No right to a private workspace work space.	2,34 (2,04-2,64)	0,28	1,12
IL5.6	The formal structure involves too much paperwork.	1,80 (1,51-2,10)	0,24	0,93
IL5.13	My supervisor does not have confidence in my job performance.	2,41 (2,11-2,71)	0,23	0,81
IL5.17	My team is disorganized.	1,87 (1,60-2,15)	0,20	0,75
FC6.7	My team does not protect me from unfair work demands made by my bosses.	2,02 (1,75-2,28)	0,19	0,61
FC6.9	The organization lacks direction and purpose.	2,06 (1,79-2,32)	0,17	0,58
FC6.18	My team puts too much pressure on me.	2,22 (1,94-2,50)	0,16	0,41
FC6.21	I feel uncomfortable working with members of other work units.	2,39 (2,12-2,67)	0,15	0,28
RG7.8	My team does not provide me with technical assistance when needed.	2,01 (1,73-2,28)	0,14	0,15
RG7.19	The chain of command is not respected.	2,15 (1,86-2,43)	0,12	0,03

b. Graphical analysis of factor behavior

Finally, in order to analyze the behavior of the factors in greater depth, the multidimensional scaling

technique presented in figure 1 was used. Considering two dimensions for the analysis, it is possible to see how the factors tend to group together in a single cluster, with the exception of the factors "I am not in a position to control the activities in my area of work" (EO2.16) and "my supervisor does not care about my personal well-being" (TO3.22). It should be noted that the first factor had the highest average score in the sample.

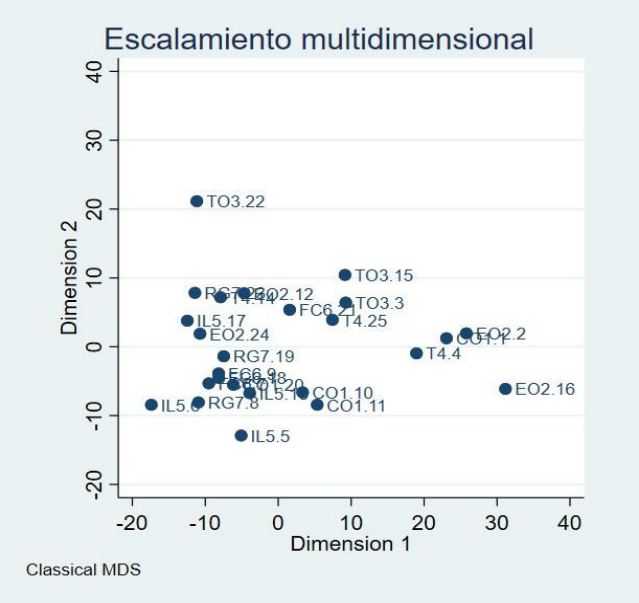

Figure 1. Graphical analysis of Multidimensional Scaling (MDS)

DISCUSSION

This study validates the unidimensional structure of the ILO-WHO Scale and shows high internal reliability, with a Cronbach's alpha of 0,96 and an expected a posteriori reliability (EAP) of 0,977, thus exceeding the threshold of 0,90 recommended for risk assessment instruments. This supports its use in monitoring psychosocial risk in Chilean teachers. The significant load of the item "Mission/goals not understood" (λ = 0,796) highlights that organizational ambiguity is a key stress factor, aligning with the literature on role demands and strategic clarity in school settings (Lemos et al., 2019; Aguilar & Cazares, 2022).[10,11]

However, fourteen items showed commonalities less than or equal to 0,05, indicating low explained variance, which suggests that they could be reformulated or eliminated in future versions of the scale.[12] In this regard, Ivancevich et al.[13] described seven specific organizational domains in the ILO-WHO Scale in 1989: climate, structure, territory, technology, leader influence, cohesion, and group support, which were reiterated in recent applications in Ecuador.[14] When applying the 25 items to teachers in Ñuble, parallel analysis and the polychoric matrix revealed a unifactorial solution that captured 63 % of the total variance, supported by a KMO of 0,963, suggesting that in homogeneous, goal-oriented educational contexts, stressors are grouped into an overall construct of "organizational tension."[15,16]

The high intercorrelation between items on role ambiguity and supervisory support reinforces that strategic clarity and school governance are latent stressors, blurring the boundaries between dimensions that remain independent in more diverse environments. The results are consistent with recent psychometric literature: in the adaptation by Torvisco et al.[17], the scale showed outstanding properties and a "compact" structure, evidencing very high loadings on a single factor that explained more than 60 % of the variance, confirming the existence of a single latent core. In contrast, the Peruvian version by Suárez identified two factors: "Organizational Conditions" (21 items) and "Administrative Processes" (4 items), which explain 43,60 % of the variance, thus reflecting functional diversity in the context of administrative contact.

This disparity suggests that the dimensionality of the scale is not fixed but is sensitive to the type of occupation and the degree of task integration. Therefore, while professions with standardized pedagogical roles integrate stressors into a spectrum or range of possibilities, sectors with marked bureaucratic processes maintain differentiated substructures. The evidence solidifies a general stress factor, but invites further investigation using bifactorial models or Item Response Theory (IRT) to examine the emergence of secondary factors in occupations with prominent administrative demands.[21,22]

The median stress score (85/125) is classified in the "moderate-high" category, aligning with recent meta-analysis ranges of 8,30 %–87,10 %.[23] Research in Latin America during and after the pandemic reports prevalences of severe burnout between 13 % and 27 %,[24] which coincides with the workload and rapid digital adaptation observed in the Chilean teaching profession. Compared to the European validation by Torvisco et

al.[17] our total explained variance (63,40 %) was slightly higher, possibly reflecting the cultural homogeneity of the sample and the specificity of the teaching context.

The theoretical implications can be understood through the Job Demands-Resources Model (JD-R), which states that job demands, such as pressure for results and role ambiguity, erode worker energy. The low factor loading of items related to social support suggests that teachers in Ñuble perceive these resources as stable, with insufficient variability to explain psychological stress.[25,26]

From an applied perspective and in the field of public policy in Chile, Law 16.744[27] together with Exempt Resolution 336 of the SUSESO [28] establish the obligation to assess psychosocial risks at work; however, the official instruments available (such as CEAL-SM/SUSESO) do not specifically address the stress perceived by workers. The validated version of the ILO-WHO Scale offers a brief and empirically based alternative, facilitating periodic monitoring in educational institutions. At the same time, recent evidence supports digital platforms for managing stress. A controlled trial in Germany showed that an online program significantly reduced the stress perceived by novice teachers. A review suggests that psychosocial interventions combining emotional regulation training with group support are feasible in middle-income settings. These initiatives could be integrated into the PRIMA-EF (Psycosocial Risk Management - Excellence Framework) framework, combining organizational actions and individual programs to strengthen teacher resilience.

Finally, it is suggested that an Item Response Analysis (IRT) be carried out to determine the discrimination and difficulty of each item; those with no commonalities could be eliminated without sacrificing accuracy. In addition, future factorial confirmations should assess invariance by gender and educational level, considering that research in Latin America indicates significant differences in exposure to stress according to gender and educational stage.[32,33] The future research agenda includes evaluating the predictive validity of the scale in relation to absenteeism, intention to resign, and psychiatric disorders, as well as examining the semantic and conceptual equivalence of the items in indigenous and rural communities, and considering the return on investment (ROI) of interventions associated with the scale, aligning these findings with international guidelines.

CONCLUSIONS

The present study confirms that the ILO-WHO Work-Related Stress Scale is a unidimensional instrument with excellent psychometric properties in the Chilean teaching population, achieving a Cronbach's alpha of 0,96 and an expected a posteriori reliability (EAP) of 0,977, demonstrating its effectiveness in measuring work-related stress. The unifactorial solution explains 63 % of the total variance and offers adequate sample adequacy (KMO = 0,963), which validates its use in psychosocial risk monitoring contexts, aligning with Chilean regulations (Law 16.744 and Exempt Resolution 336-SUSESO). This positions it as a useful tool for occupational health management in educational institutions, allowing for the comparison of metrics over time and facilitating the formulation of intervention plans. However, caution should be exercised in its application, as the study revealed that some items had low communalities, suggesting that they could be improved or eliminated. In addition, the high burden of items related to role ambiguity underscores the need to implement educational policies that clarify curricular goals and responsibilities, as well as to offer ongoing training to teachers in managing work demands. Although the instrument has high reliability and is suitable for longitudinal cohort follow-up, it is recommended to investigate its factorial invariance as a function of variables such as gender, educational level, and type of contract.

In terms of future projections, it is suggested that bifactorial or Item Response Theory (IRT) models be used to refine the scale, allowing for the creation of more concise versions that are suitable for contexts with time and resource constraints. In summary, the ILO-WHO Scale emerges as a reliable benchmark in the field of occupational health for teachers, although a more in-depth analysis of its structure and validation in various subpopulations is required to strengthen the generalization of its results.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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